AI for Virtual Humans

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A bit of background…

- *Major goal at ICT:* Create compelling VR environments for training
    - High quality graphics
    - Immersive sound
    - Strong storyline
    - Virtual humans

AI Virtual Humans

- Behaviors not pre-scripted
  - Behave by understanding situation and reasoning about possibilities
- Communicate in natural language
- Can explain actions & coach
- Respond emotionally to situation

Looking back….

- Early attempts failed to create unified intelligent systems exhibiting a broad variety of behaviors

What's different now?

- Faster, more powerful (& cheaper) hardware
- Some of the hard problems have working solutions
  - e.g. speech recognition
- Better software environments support modular architectures
  - Don't have to build it all yourself
- Hybrid approach: synergy through mixing techniques
  - Symbolic, probabilistic, neural nets, etc

What's different now? (cont'd)

- Model based programming

Large procedural program

Model (knowledge)

⬍

Reasoner
perceive-reason-act
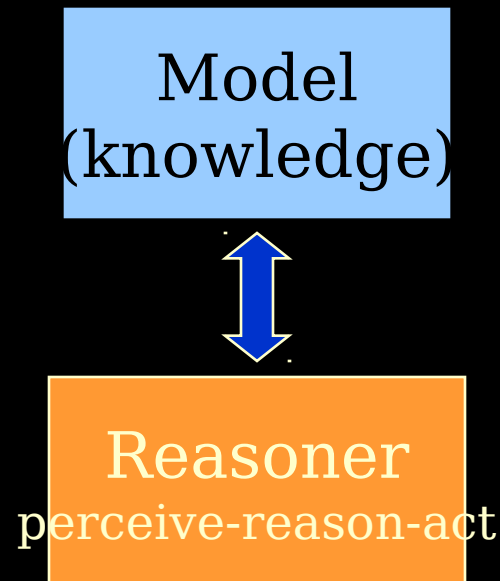
Example: Model Based Programming for Task Oriented Domain

Model

Task1	Task2	Task3	Task4
Preconditions:	Preconditions:	Preconditions:	Preconditions
Effects:	Effects:	Effects:	Effects:

Reasoner

Task3 → Task4 → Task1

- Robust to changes in world state
- Model easier to modify
- Model explainable
- Model can be used to understand other's actions

Mission Rehearsal Project: Operations in the New Millennium

Mission Rehearsal Exercise Project

- Virtual Reality Environment
  - Immersive Audio and Graphics
  - Virtual Humans with reasoning and emotion
    - Locals
    - Friendly and hostile elements
    - Coach
  - Dilemmas and decisions
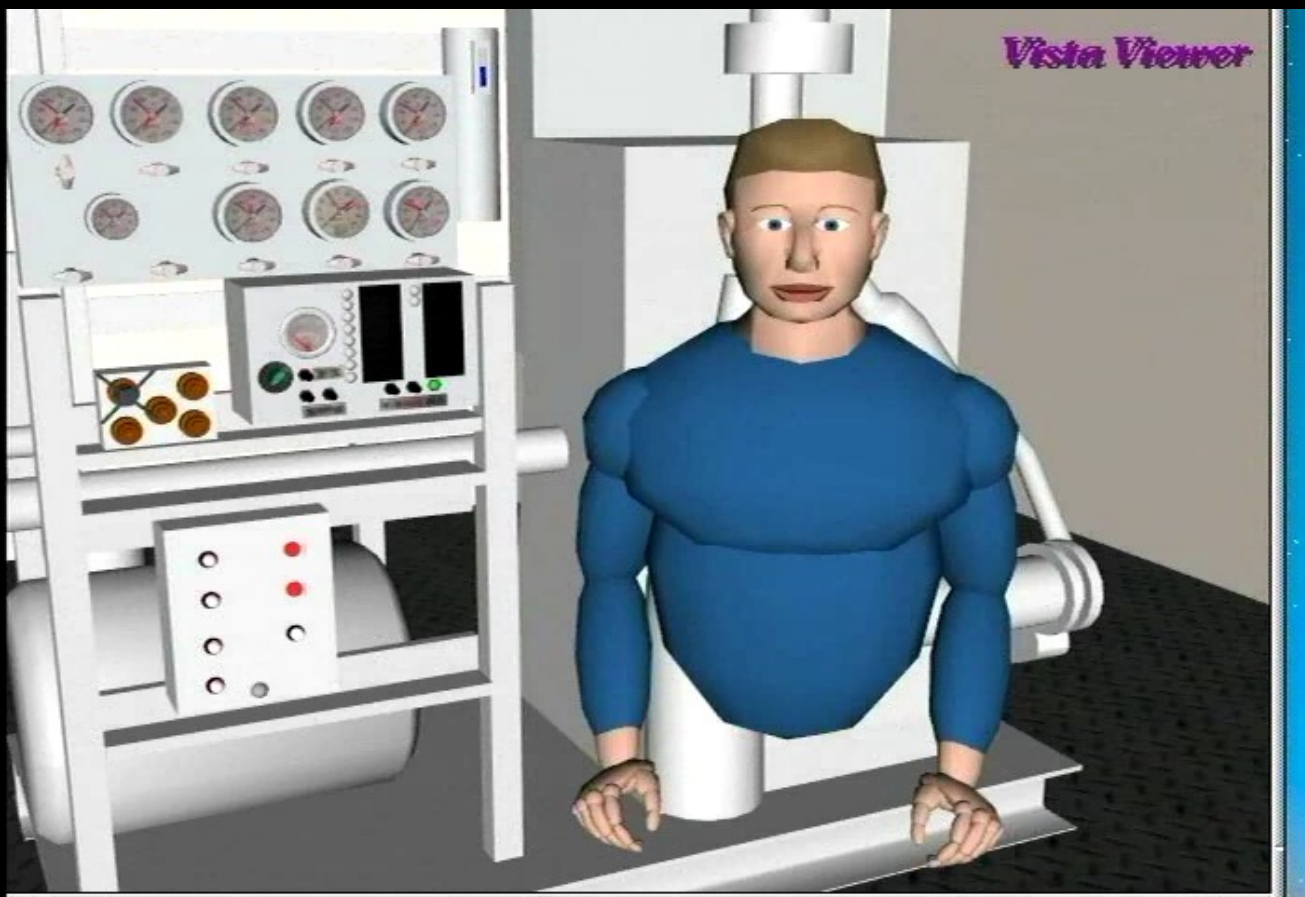
ICT Virtual Reality Theater

Mission Rehearsal Clip

Coaching

Missing Emotions

Adding Emotions

Summary

- Using AI we're beginning to create characters that have much richer behaviors and depth

- Opens up possibility for new kinds of games